Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A method for inspecting ~~an object~~ a populated printed circuit board and detecting defects, said method comprising:

injecting a heat pulse by laser ~~light~~ beam at a selected point on a bottom surface of said ~~object~~ populated board, whereby heat transmits through a top surface of said ~~object~~ populated board;

capturing a sequence of consecutive thermal images of said top surface of said ~~object~~ populated board to record heat diffusion over time resulting from said heat pulse;

comparing a thermal data pattern of said heat diffusion over time at said point on said ~~object~~ populated board to a data set of a reference, wherein said reference comprises upper and lower limits of acceptable thermal heat diffusions of said point on said populated board in time following heating; and

determining whether said ~~object comprises~~ populated board has any defects based on said limits.

2. Canceled.

3. (Original) A method as claimed in claim 1, wherein said capturing a sequence of consecutive thermal images comprises capturing a first image prior to said injecting a heat pulse.

4. (Original) A method as claimed in claim 3, wherein comparing further comprises subtracting data of said first image from data of subsequent images taken after said injecting a heat pulse in order to remove ambient and variation effects.

5. (Currently amended) A method as claimed in claim 1, wherein said step of comparing said heat diffusion over time at said point on said ~~object~~ populated board to a

reference comprises comparing an area of interest surrounding said point on a sequence of images to an area of interest surrounding said point on a sequence of reference images.

6. (Currently amended) A method as claimed in claim 5, wherein said reference images are the average of a plurality of images of known defect-free ~~objects~~ populated boards.

7. (Currently amended) A method as claimed in claim 1, further comprising the steps of:

holding said ~~object~~ populated board in place, ensuring a precise positioning in space;

maintaining said ~~object~~ populated board at a stable temperature;

programming an entire set of points on said ~~object~~ populated board to be inspected;

injecting a heat pulse by laser ~~light~~ beam at a next point on said ~~object~~ populated board, said next point determined by said set of points;

repeating said step of injecting a heat pulse by laser ~~light~~ beam at a next point on said ~~object~~ populated board until all points in said entire set of points have been inspected;

providing a compilation of results to produce a complete analysis after said entire set of points on said ~~object~~ populated board has been inspected.

8. (Currently amended) A method as claimed in claim 7, further comprising the step of waiting for temperature of at least one of said ~~object~~ populated board and an area to be inspected to return to an ambient temperature before said repeating said step of injecting a heat pulse by laser ~~light~~ beam.

9. (Currently amended) A method as claimed in claim 1, wherein said laser ~~light~~ beam is collimated, redirected, and modified to provide maximum heat power without damaging said ~~object~~ populated board's surface.

10. Canceled.

11. (Currently amended) A method as claimed in claim ~~10~~ 1, wherein ball-grid arrays are mounted on said populated board and said defects to be detected are the quality and integrity of solder junctions between said populated board and said ball-grid arrays.

12. (Currently amended) A method as claimed in claim ~~10~~ 1, wherein flip chips are mounted on said populated board and said defects to be detected are the quality and integrity of connections between said flip chips and said populated board.

13. (Original) A method as claimed in claim 11, wherein each said heat pulse is directed to a point beneath a solder joint that will allow the maximum amount of injected heat to reach said solder joint.

14. (Original) A method as claimed in claim 13, wherein each point in said set of points corresponds to a ball in a ball-grid array.

15. (Currently amended) A method as claimed in claim 7, wherein ~~said object is a populated board and~~ said populated board is held in a precise position in space by mounting said populated board onto register pins.

16. (Original) A method as claimed in claim 1, wherein an energy of said heat pulse is varied depending on a position within said populated board in order to optimize imaging of said heat diffusion.

17. (Current amended) An apparatus for inspecting ~~an object~~ a populated printed circuit board and detecting defects, said apparatus comprising:

a mounting for supporting said ~~object~~ populated board and exposing a top surface and a bottom surface of said ~~object~~ populated board;

a pulsed laser source having a beam able to be positioned for providing a heat pulse at a precise location on said bottom surface of said ~~object~~ populated board;

a thermal camera for capturing thermal images of said top surface of said ~~object~~ populated board;

a frame grabber for capturing a sequence of image signals from said thermal camera;

a memory unit for storing data representative of heat diffusion over time resulting from said heat pulse obtained from said sequence of image signals; and

an analyzing unit for comparing said heat diffusion data to a reference data set, said reference comprising upper and lower limits of acceptable thermal heat diffusions of a specific area on said ~~object~~ populated board.

18. (Currently amended) An apparatus as claimed in claim 17, further comprising an X-Y galvanometer to align said pulsed laser source with said precise location on said ~~object~~ populated board.

19. (Currently amended) An apparatus as claimed in claim 18, further comprising a controller programming an entire sequence of points on said ~~object~~ populated board and causing said X-Y galvanometer to sequentially target each point of said sequence of points.

20. (Original) An apparatus as claimed in claim 18, further comprising

focusing optics for converging, diverging, and deflecting said pulsed laser source;

an optical power attenuator to adjust power of said heat pulse; and

an input/output interface to control said X-Y galvanometer, said pulsed laser source, and said optical power attenuator.

21. (Original) An apparatus as claimed in claim 17, wherein said mounting means further comprises register pins.

22. (Currently amended) An apparatus as claimed in claim 17, wherein said mounting comprises a stage allowing said ~~object~~ populated board to be moved in the x and y direction.

23. (Original) An apparatus as claimed in claim 22, wherein said mounting can also move in the z direction.

24. (Currently amended) An apparatus as claimed in claim 22, further comprising a controller programming an entire sequence of points on said ~~object~~ populated board and causing said mounting to align sequentially each point of said sequence of points on said ~~object~~ populated board to said pulsed laser source.